USER MANUAL

4E1/100BASE-FX Interface Converter

Beijing Inmidas Technology Co., ltd

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1.Description

The 4E1&10/100Base- FX Bridge is a device that takes ASIC chip as its core and enables Ethernet data to be transmitted through multi E1 channels. The 4E1&10/100Base- FX Bridge breaks through the bandwidth limit of single E1 Ethernet bridge. It is very easy to make use of the existing rich E1 resources in the public networks to quickly extend the range of the Ethernet LAN. The 4E1&10/100Base- FX Bridge is an enhancement model of the Ethernet to multi E1 converter. It means that with a built-in bit error detector, the device can find which E1 is not capable to be used because of too much bit errors, and then automatically cut down the bad one, to keep the Ethernet data transmission continuously.

The 4E1/100BASE-FX Interface Converter with fiber optic interface is a multifunction and high performance L2 switch which build in three port cross engine to realize the conversion between two Ethernet interface and E1 interface. The equipment supports the function used as Ethernet transceiver or Ethernet net bridge or fiber optic modem. As the extension of Ethernet, This converter may realize Ethernet interconnection at low cost via the E1 channel provided by existing network.

E1 interfaces conforming to ITU-T G.703 and G.704 proposals are provided at the end of WAN, supporting RJ45 and BNC connection modes. The E1 ports support both framing and un-framing architecture. The user can select an operating mode for the E1 interface according to the connected E1 environment. This provides flexibility of network application. In the framing mode, the E1 interface provides a rate of N*64Kbps（N=1~31）. In the un-framing mode, the 4 E1 channel provides a rate of 7.936 Mbps and accomplishes transparent transmission.

The 4E1/100BASE-FX Interface Converter provides plenty of self-test functions, supporting local loop and remote loop. It also provides pseudo random code test function to test error codes in the circuit.

It is proposed to use the products of this series in pairs.

A typical application is shown in figure 1.

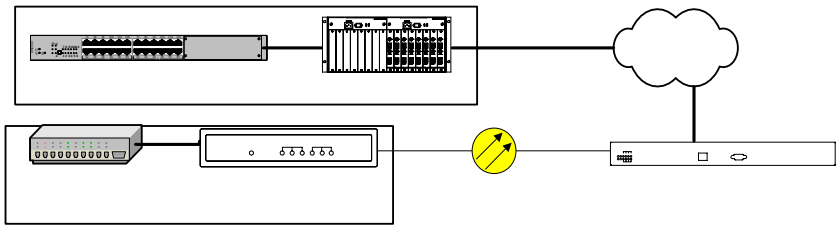


Figure1 typical application of 4E1&10/100Base- FX Bridge

Another typical application is shown in figure 2.

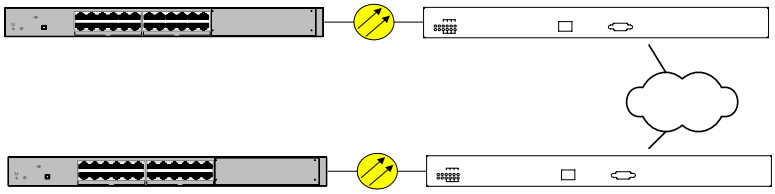
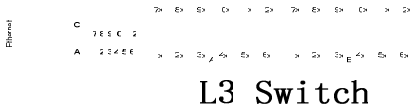


Figure2 typical application of 4E1&10/100Base- FX Bridge

2. Technical specifications



Protocol: G.703, G.704, G.736, G.823, I.431
IEEE802.3 10BASE_T

1. E1 interface:

   Impedance 75ohm,physical interface BNC Impedance 120 ohm, physical interface RJ45

   Interface rate:2.048 Mbps

   Coding:HDB3

   Jitter to lerance: according with protocol G.823

   Output jitter < 0.05UI

   Transmission range:300m(UTP) 600m(coaxial cable)

2. Ethernet interface(RJ45):

   Data Rate: 10/100Mbps auto-negotiation

   Standard: Compatible with IEEE802.3

   Connector: RJ-45

   Full duplex auto-negotiation

3. Ethernet interface(FO):155M fiber optic transceiver nodule,SC type

   SM or MM and single or double fiber optional

   Transmission range:120 Km(SM),2Km(MM) Standard 40 Km(SM)

4. Architecture:

   Stand alone: 265mm(W) × 160mm（D）× 44mm（H）

   Rack mount: 19 in standard 4.5U cabinet;

5. Power supply:

   Stand alone:160V～270V AC input,5V/2A output

-40V～-60V DC input,5V/2A output

Rack mount:150V～260V AC input,5V/16A、12V/1A output

38V～-58V DC input,5V/16A、12V/1A output

6. Other Specification

Operation temperature:0℃～50℃

Storage temperature:-20℃～80℃

Humidity:5%～90%(no condensation)

3 Installation and Panel description

3.1 Unpacking (stand alone E1 to Optical Ethernet Interface Converter)

Check the accessories and spare parts when opens the package. In case of missing, immediately contact our offices or agencies. Check for the following items:

■4E1/100BASE-FX Interface Converter

■ An Operation manual

■ A supply cord

■ 8 plugs for coaxial cable

In case of any damage in transportation, contact our offices or agencies.

3.2 Front and rear panel of the stand alone device

- The front panel of 4E1/100BASE-FX Interface Converter is shown in figure 3.

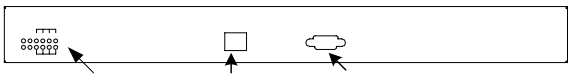
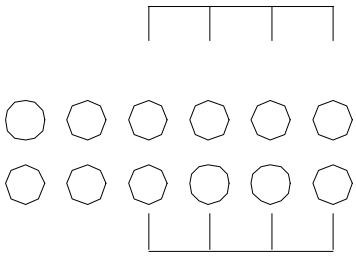


Figure 3 front panel of 4E1/100BASE-FX Interface Converter

Explanations for the two rows of indicators at the left are as follows:



POWER: Power. Always lights after starting up.

RUN: Flickers when the Network Manager Software is running

UTP LNK: lights When the Electric Ethernet interface is working

FO LNK: lights When the Fiber Optical Ethernet interface is working

LOF: Alarm indicator lamp for input signal out-of-frame in E1 line. Constantly lightening indicates the alarm with local device; flash indicates the alarm with opposite device. Alarm status of opposite device can be detected only at framing mode.

LOS: E1 link interruption alarm. Always lights after starting up till synchronization is established. It also lights in case of E1 link interruption or signal loss in communication.

- The AC input rear panel of 4E1/100BASE-FX Interface Converter is shown in figure 4.

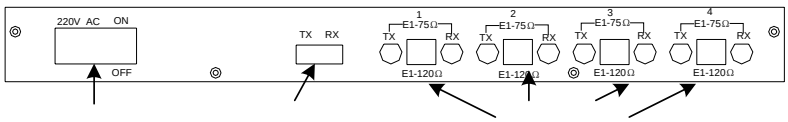


Figure 4 AC input rear panel of 4E1/100BASE-FX Interface Converter

220V AC: AC socket with two cores

OFF/ON： Power switch. When the ON button is pressed down, the power supply is turned on 8 bits coded

E1-75Ω TX／RX: BNC transmission/reception socket for 75Ω impedance E1 interface

E1-120Ω: RJ45 socket for 120Ω impedance E1 interface

TX RX: socket for E1 transfer, TX indicator of E1 data transmission, RX indicator of E1 data receives.

- The DC input rear panel of 4E1/100BASE-FX InterfaceConverter is shown in figure 5.

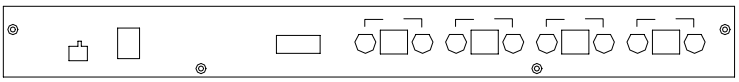


Figure5 DC input rear panel of 4E1/100BASE-FX Interface Converter

48V DC： DC -48V power supply connector

The others are the same as in figure 4.

3.3 Front and rear panel of the rack mount

PWR Optical Eth

- Front and rear panel of the rack mount, its shown in figure 6

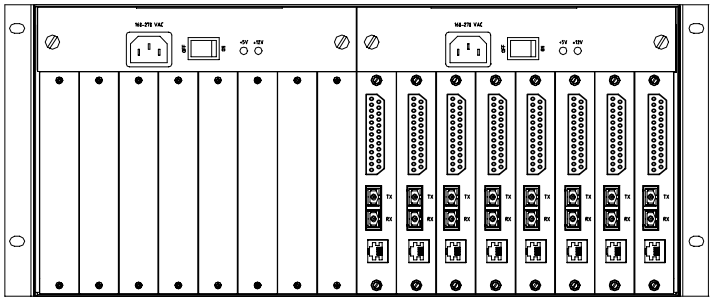


Figure 6 Front panel of RACK

+5V: 5V main power indicator

+12V: 12V fan power indicator

Underneath the panel there are a indicator matrix. See figure 7 about the description of the front panel of optical Ethernet Interface Converter for its functionality.

- The rear panel of RACK/AC is shown in figure 7.

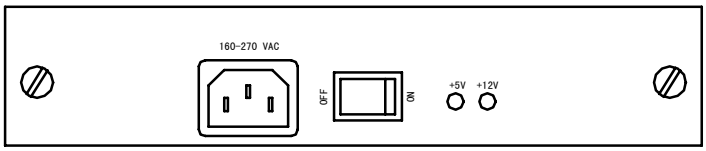


Figure 7 panel of rack/AC

The panel above consists of three different small panels: as described below:

➢ The small panel of optical Ethernet Interface Converter module, as shown in figure 8.

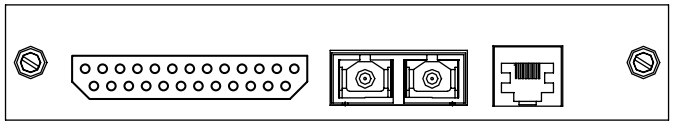


figure 8 Panel of 4E1/100BASE-FX Interface Converter module

See figure 4 about the description of AC input rear panel of optical Ethernet Interface

➢ The panel of RACK/AC AC redundant power supply is shown in figure 9.

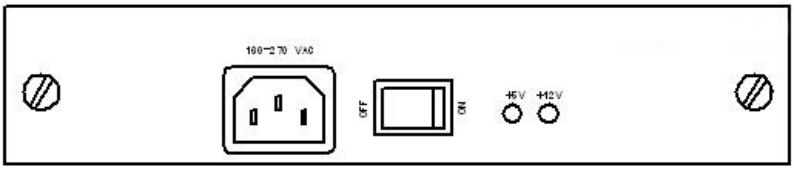


Figure 9 Panel of rack/AC AC redundant power supply

160-270VAC: AC 220V input socket

ON OFF: power converter

+5V: 5V main power indicator

+12V: 12V fan power indicator

- The panel of RACK/DC DC redundant power supply is shown in figure 10.

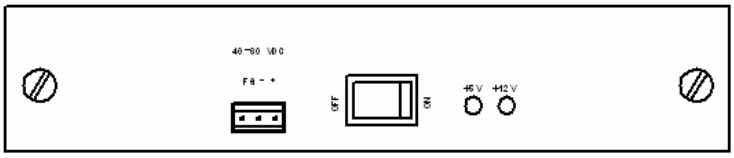


Figure 10 Panel of rack/DC DC redundant power supply

40-60VDC: DC-48V connector (FG to protective GND, "-+" is the polarity of the –48V DC input)

ON OFF: power converter

+5V: 5V main power indicator

+12V: 12V fan power indicator

3.4 whole equipment installation

4E1/100BASE-FX Interface Converter installed indoor normally, rack can placed on the desk or wall. If it be placed on general 19 inch rack , you'll add two bars under the low-cover, its shown in figure 11

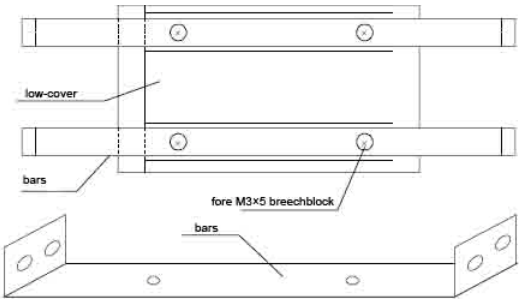
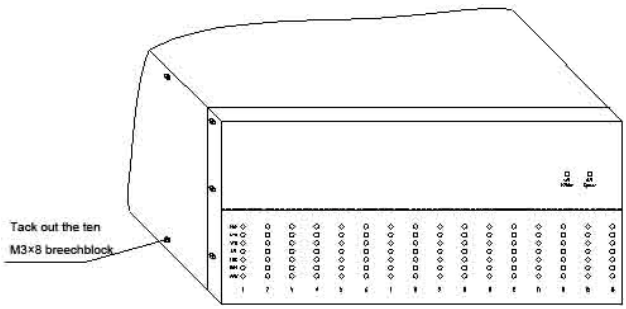


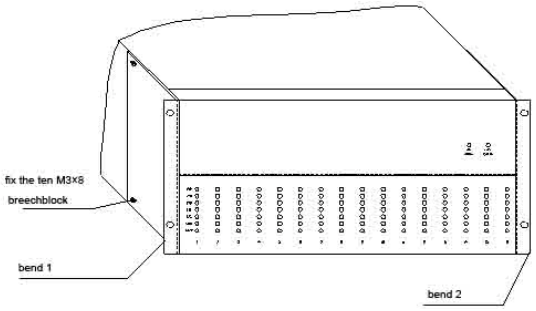
Figure 11 for Engine of Stand alone

Rack will be placed on general 19inch rack, the operation by step is blow:

Tack out the ten M3×6 breechblock on the flank of the box, which is shown in figure 12



Tack out the pair of bend-element in the appendix, attention no exchange the left & right. Make the bend-element on the flank of the box by the ten M3×8 breechblock on the appendix ,which is shown in figure



E1 interface line will fetch out from BNC socket or RJ45 socket which are on the rear panel, Ethernet interface line also from the RJ45 socket on the rear panel, fiber interface too.

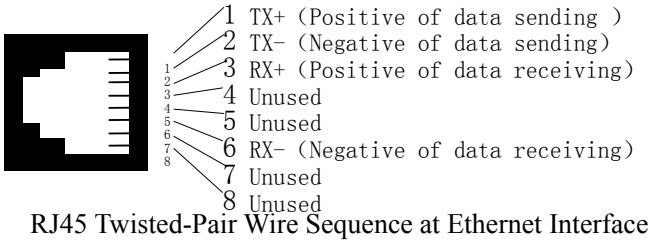
4. Applications of 4E1/100BASE-FX Interface Converter

4.1 Definition of balanced twisted-pair wire sequence for RJ45 interface

4.1.1 10/100BASE-T interface wire sequence

The RJ45 Unshielded twisted-pair for 10/100BASE-T interface can use DCE or DTE standard stipulations, it support AUTO MDI/MDX function.

As shown, wire 1 and wire 2 are sending wire, and wire 3 and wire 6 are receiving wire.


1 TX+ (Positive of data sending)
2 TX- (Negative of data sending)
3 RX+ (Positive of data receiving)
4 Unused
5 Unused
6 RX- (Negative of data receiving)
7 Unused
8 Unused

RJ45 Twisted-Pair Wire Sequence at Ethernet Interface

4.1.2 E1 interface wire sequence

1 and 2 are transmitting lines, 4 and 5 are receiving lines, as shown in figure 17.

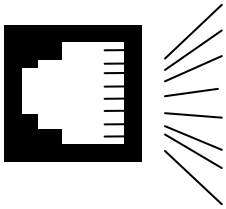


Figure 17 RJ45 balanced twisted-pair interface wire sequence for E1 interface

4.1.3 4E1/100BASE-FX Interface Converter Module E1 interface wire sequence

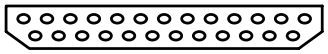


Figure 19 RJ45 use DB25 connector:

Figure 19 RJ45 balanced twisted-pair interface wire sequence for E1 interface wire sequence as below:

13

25

2 ---TX1+ ， Line 1 E1 TX+
3 ---TX1- ， Line 1 E1 TX-
15---RX1+ ， Line 1 E1 RX+
14---RX1- ， Line 1 E1 RX-

4 ---TX2+ ， Line 2 E1 TX+
5 ---TX2- ， Line 2 E1 TX-
17---RX2+ ， Line 2 E1 RX+
16---RX2- ， Line 2 E1 RX-

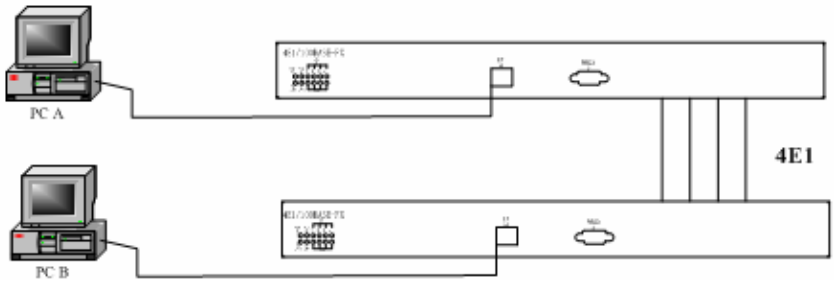
7 ---TX3+ ， Line 3 E1 TX+
8 ---TX3- ， Line 3 E1 TX-
21---RX3+ ， Line 3 E1 RX+
20---RX3- ， Line 3 E1 RX-

11---TX4+ ， Line 4 E1 TX+
12---TX4- ， Line 4 E1 TX-
25---RX4+ ， Line 4 E1 RX+
24---RX4- ， Line 4 E1 RX-

4.2 Simple self-test methods for devices and E1 circuits

Test 1: test of back-to-back connection

Connect two FE1&10/100BASE-T bridge devices back to back, ping the other's IP address on the two computers to test the two devices.



4.3 Common questions and their maintenance

(For independent interface converter, reference for frame bridge)

No.	Symptoms	Causes	Remedies
1	The power indicator does not light after starting up.	The power circuit has a failure.	1. The power is not connected. Check the contact of the power lines and the converters. 2. The internal fuse of the equipment is broken. Replace the fuse. 3. The internal power module has a failure. Send it rear to factory for repair.
2	Indicator LNK does not light when the Ethernet network is connected.	Integrity test of link has not passed.	1. The type of the cable does not meet the DTE/DCE modes of the Ethernet ports of the equipment. 2. The crystal head of the cable is not well molded. Check the quality of the UTP cable. 3. The rate setting of the converter or the network card is wrong. See 5.3. 4. The internal circuit of the equipment is damaged. Send it to factory for repair.
3	Indicator LOS always lights when the cable at the E1 port is connected.	The circuit signals are lost.	1. Check the coaxial cable or the UTP5 twisted pair for open circuit and short circuit. Check whether the plugs are positioned. 2. The factory default of the equipment is 75ΩBNC interface. S5.6~S5.8 should be reconfigured if a 120ΩRJ45 interface is used. See 5.2.1 for reference. 3. The internal circuit of the equipment is damaged. Send it to factory for repair.
4	Indicators are normal, but communication can not be done.	The opposite devices are in the state of local loop test and the Ethernet link of the opposite devices has no communication.	The setting of LLOOP of tumbler converter S5 is wrong. The converter for local loop test should be set to OFF(turn up) to make it invalid. The Ethernet link of the opposite interface converter has a failure. Check the opposite devices according to item No. 2 in the table.